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Migration Statistics**Measuring integration of immigrants and descendants –
Danish experiences with register-based data****Prepared by Statistics Denmark***Summary*

The paper describes the advantages of a register based system with complete data in conditions where populations are diverse regarding age composition. The paper introduces Statistics Denmark's definition of immigrants, descendants and persons of Danish origin and explains how this approach is preferable to a definition based solely on the place of birth or citizenship. Some examples of labor market and education statistics are also given where it is necessary to consider immigrants' and descendant's characteristics regarding age composition and educational preferences. The paper notes the importance of data on educational attainment as the Danish register based system is unable to provide sufficient information about immigrants' educational attainment.

The paper is presented for discussion to the Conference of European Statisticians seminar on migration statistics.

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I. Definition of ancestry

1. Denmark has had a register-based population register since 1968. Every person in the Danish population has a unique identification number (CPR), which is widely used in issues related to social security, health care, pensions, education, bank accounts, etc. Therefore, data can be linked using the CPR which makes it possible not only to have a total count of the population broken down by age, sex, etc., but also complete statistics covering the entire population about socioeconomic status, educational attainment, etc.
2. In the beginning of the 1990s, political interest emerged to identify immigrants and descendants in statistics. Statistics Denmark decided to create a new variable called 'ancestry', where each individual in the population was placed in one of the following three categories: 1) Danish origin, 2) immigrants and 3) descendants.
3. The variable was made using already available information in the population register about place of birth, citizenship, the parents' place of birth and the parents' citizenship.
 - (a) A person is categorized as 'Danish origin' if he/she has at least one parent who is both born in Denmark and has Danish citizenship. The person does not have to be born in Denmark in order to be categorized as Danish origin;
 - (b) A person is categorized as an immigrant if he/she is born abroad and has no parent who is both born in Denmark and has Danish citizenship;
 - (c) A person is categorized as a descendant if he/she is born in Denmark and has no parent who is both born in Denmark and has Danish citizenship.
4. If a person's parents have never been registered in the Danish population and no information is available about them, the person's own birthplace and citizenship decides ancestry. A person born in Denmark would be categorized as a descendant if he/she has foreign citizenship and Danish origin if he/she has Danish citizenship. A person born abroad would be categorized as an immigrant.
5. Immigrants and descendants can also be broken down by country of origin. When both parents are known the country of origin is categorized as the mother's country of birth. When only one parent is known the known parent's country of birth will decide the country of origin.
6. When no parents are known the person's own country of birth is defined as country of origin for immigrants. For descendants, who are all born in Denmark, the person's country of origin is defined as the person's citizenship country.
7. Statistics Denmark often divides all different countries of origin into two groups: Western countries and non-Western countries. Western countries are defined as all European Union countries plus Andorra, Iceland, Liechtenstein, Monaco, Norway, San Marino, Switzerland, the Vatican, Canada, United States, Australia and New Zealand. All other countries are considered non-Western in this context.

Table 1
Population in Denmark broken down by ancestry and birthplace, 1 January 2013

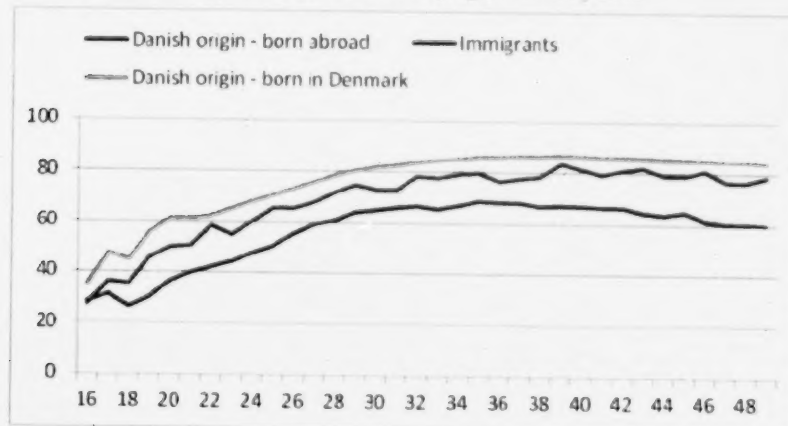
	By ancestry	Born in Denmark	Born abroad	Percentage born in Denmark
Total	5 602 628	5 080 404	522 224	90.7
Danish origin	5 001 954	4 936 116	65 838	98.7
Immigrants	456 386	0	456 386	0.0
Descendants	144 288	144 288	0	100.0

8. A very important aspect of the Danish definition is that it allows persons born abroad to be categorized as Danish origin. As can be seen from the table above 65,838 persons with Danish origin were actually born abroad. Compared to the total group of persons with Danish origin it is a very small group which only constitutes 1.3 per cent of the total. But if you look at all the persons born abroad in the Danish population their share is 12.6 per cent.

9. An important argument for using ancestry as a variable, instead of just dividing the population as born abroad and born in Denmark, is that if a person is born abroad and has a parent who is both born in Denmark and has a Danish citizenship, the person has more in common with other persons with a similar background born in Denmark than with other people born abroad. In most cases persons with Danish origin born abroad, who become a part of the Danish population, immigrate to Denmark while they are still children.

Figure 1

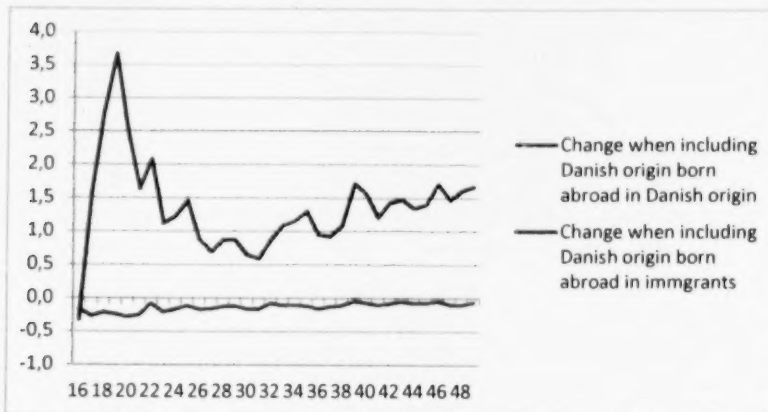
Employment rates for male immigrants and men with Danish origin born in Denmark and born abroad respectively broken down by age, 1 January 2012



10. The figure above shows that as far as employment rates are concerned persons of Danish origin are closer to persons with Danish origin born in Denmark than they are to immigrants. Even though employment rates are lower for persons with Danish origin born abroad than persons with Danish origin born in Denmark, it is preferable to have them in the same category because their influence is negligible on the complete category of persons with Danish origin.

Figure 2

Percentage point change in employment rates for male immigrants and males with Danish origin when including Danish origin born abroad broken down by age, 1 January 2012

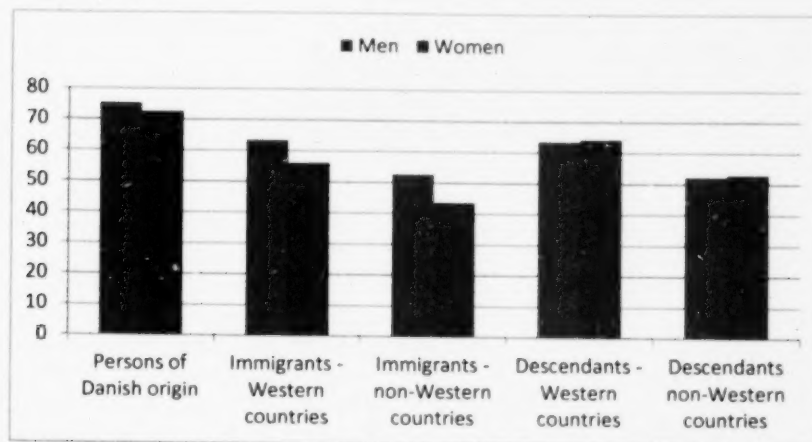


11. Including Danish origin born abroad as immigrants would overestimate employment rates for immigrants at some age levels by more than 3.5 percentage points with an average of 1.36 for all the age levels from 16 to 49. On the other hand, including Danish origin born abroad in Danish origin only causes an average negative change in the employment rate by 0.13 percentage points. Danish origin born abroad is not a very interesting group by itself in terms of integration, while immigrants are. So, clearly it is preferable to present statistics on Danish born abroad separately from other persons born abroad by including them in Danish origin.

II. Employment

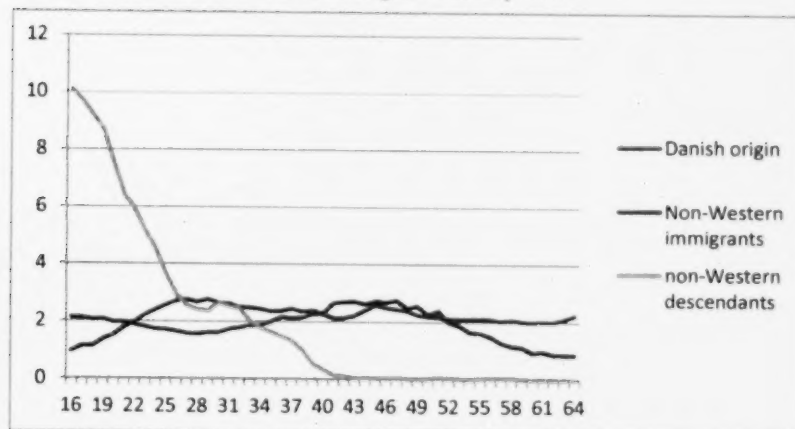
12. Employment rates are often considered one of the most important indicators for integration. A simple indicator is the employment rate for 16-64-year olds broken down by gender and ancestry.

Figure 3
Employment rates for 16-64 year olds broken down by gender and ancestry,
1 January 2012



13. One noticeable result from the figure above is that non-Western male descendants have a slightly lower employment rate than non-Western male immigrants when analysing all 16-64 year olds. A very surprising result when you consider that the descendants are born in Denmark. However, it is also a result that does not take the huge age variations between the different groups into account.

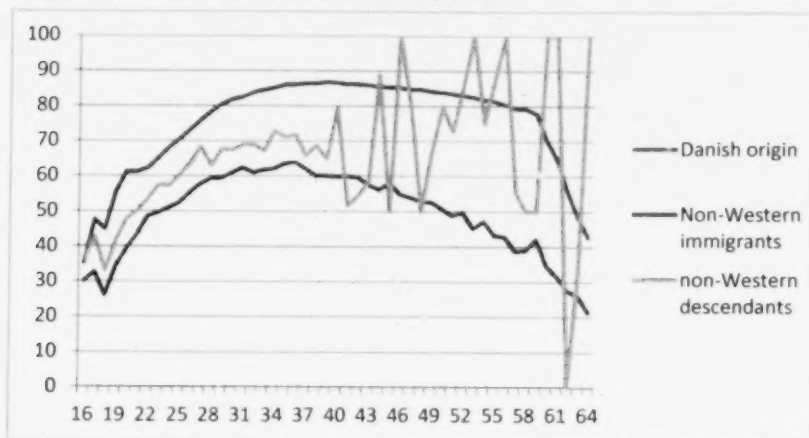
Figure 4
Age level's percentage of all 16-64 year old for non-Western male immigrants and
descendants and males with Danish origin, 1 January 2012



14. Non-Western descendants are very young and have an age distribution that is strikingly different from both non-Western immigrants and males with Danish origin. Non-Western descendants are hugely overrepresented in the lower age levels with 52 per cent of all 16-64-year old in the first six age levels alone (16-21). For non-Western immigrants 16-21 year olds only accounts for 7 per cent of all 16-64 year olds. On the other hand the population of non-Western descendants above the 40 years level is practically non-existent in Denmark.

Figure 5

Employment rates for non-Western male immigrants and descendants and males with Danish origin broken down by age, 1 January 2012



15. At the same time employment rates vary significantly with age as can be seen from the figure above. They are particularly low for the group of young people where the overrepresentation of non-Western descendants is largest and they are the highest for persons in the 30's and 40's where the population of non-Western descendants is very small. In the figure the employment rate for every age level between 16-64 years is shown, but for persons above 40 they are based on very small populations for non-Western descendants, which is the reason why they are so volatile.

16. Comparing employment rates for non-Western immigrants and descendants by age level, it is obvious that descendants have higher employment rates for almost all the age levels. The few age levels where this is not the case have a very small population of non-Western descendants and therefore have no influence on the overall employment of 16-64 year olds. However the overall employment rate is still somewhat higher for non-Western immigrants (52.7) than non-Western descendants (52.2). It can seem like a paradoxical result, but it is of course perfectly possible given the completely different age distribution of the two populations.

17. Therefore, the overall employment rate for all 16-64 year old can be a misleading indicator for descendants. If the need is for one simple number it would clearly be a better idea to look at for example 30 year olds. In this case one would have an employment rate for non-Western male descendants of 68 per cent which can be compared with 61 per cent for non-Western male immigrants and 82 per cent for males with Danish origin (82 percent). A huge benefit of having a register-based system is that you can work with the total population at all age levels. Therefore, most of the time calculations for individual age levels are reliable for all groups, and are often preferable when comparing populations with very different age distributions.

III. Educational attainment

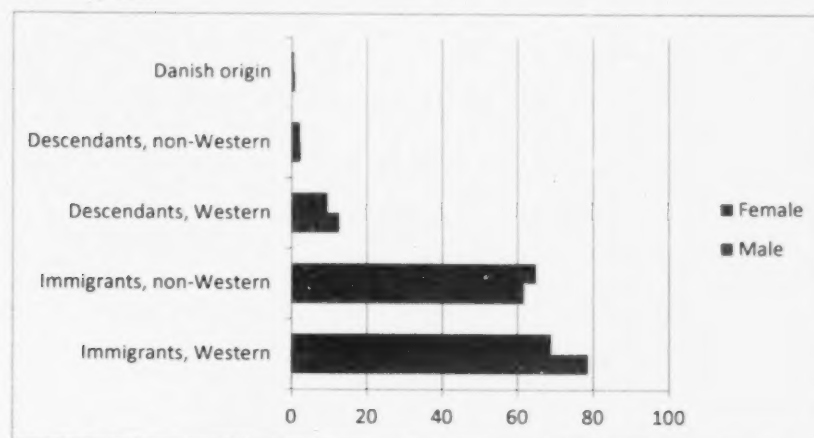
18. The foundation for Danish statistics on education is data from Danish education institutions at all levels. Records in these data sources are created when a person starts in a particular education, when he/she finishes the studies or if the person abandons the studies without finishing them. In many ways it is a unique system which has almost endless

possibilities in terms of analyses, as persons can be identified and linked with other relevant data – for example labour market or social benefits data.

19. However, when it comes to matters related to integration the system is of limited value. In practice only education completed in Denmark is registered. Most immigrants have no completed Danish education, as most have immigrated to Denmark as adults.

Figure 6

**Percentage with no Danish education by 16-64 year olds broken down by ancestry.
1 January 2013**

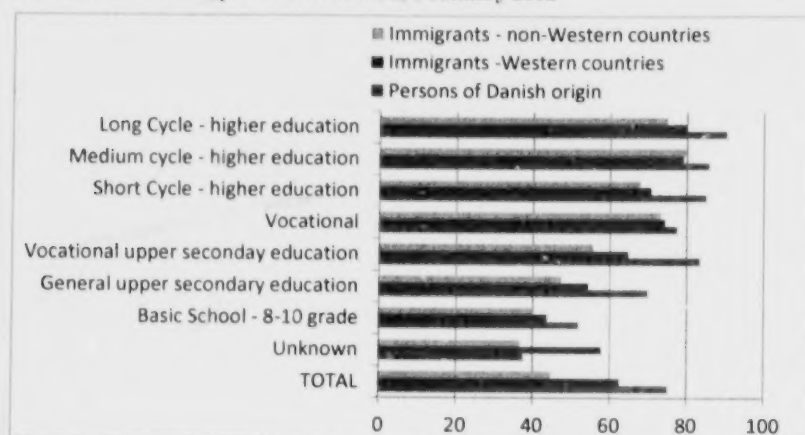


20. Over the years, some efforts have been undertaken to fill out missing information for immigrants by conducting surveys. However, response rates have been poor and the answers received are not completely comparable with data collected from Danish education institutions. There have been attempts to use survey data as inputs for an imputation model. But in general, the problem with lack of data is so significant that no solution, however advanced it may be, will be able to produce data on educational attainment for immigrants which can be compared with other groups in a meaningful way. Furthermore, a solution based on imputation also makes it difficult to use data at the most detailed level.

21. Analyses and indicators on education and integration should therefore be restricted to education completed in Denmark, which rules out most of the immigrant population. However, it is still possible to compare persons who have actually completed a given education in Denmark with persons of Danish origin with the same educational background. Linking education data with labor market data, one could for example calculate employment rates for these particular groups. It is relevant in order to measure whether immigrants with Danish education at a given level have similar employment rates to persons of Danish origin with the same education level. One should also keep in mind that this group of immigrants constitutes a relatively low proportion of all immigrants. In addition, immigrants with Danish education have overall been in Denmark for a longer time than other immigrants, which is something that alone could have an influence on employment.

Figure 7

Employment rates for 25-64 year old females broken down by ancestry and educational level. Only Danish education, 1 January 2012

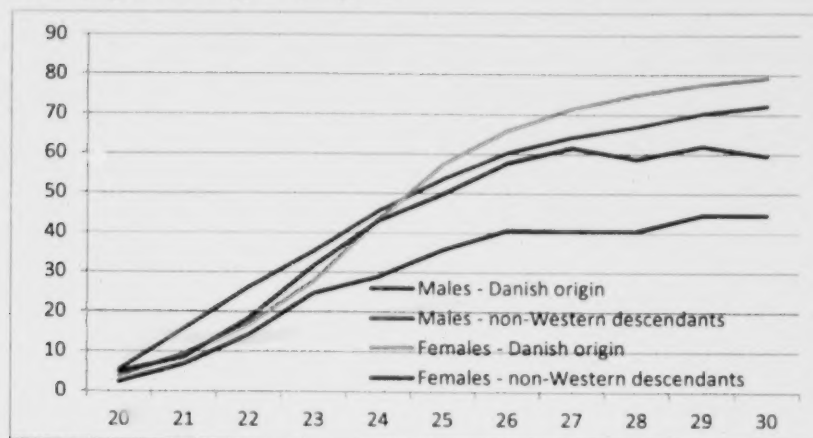


22. Immigrants do not have as high employment rates as persons with Danish origin, even when they have completed Danish education at the same level. However, differences are smaller when you look at a given educational level compared to the overall situation. For all 25-64 year old females only 45 per cent of the non-Western immigrants were in employment compared to 75 per cent for women with Danish origin. Only the levels Vocational and the three levels of higher education give qualifications which can be used directly in the labor market. Among these levels the differences are clearly smaller, especially for the levels Vocational and Medium cycle – higher education where non-Western immigrants only lag employment rates of women with Danish origin by 4 and 6 percentage points respectively. Looking specifically at the group of immigrants who have actually completed education in Denmark, is an example of how educational data can still be used for relevant statistics even though overall coverage for immigrants is very low.

23. Descendants, who are all born in Denmark, are easier to compare with persons with Danish origin in terms of educational attainment than immigrants. However the issue about their age distribution described in the labor market section is also highly relevant regarding education. Non-Western descendants have an age distribution where it is in practice only young people's educational attainment which can be analyzed. Regarding educational attainment among young people, it is in general a good idea to look at single age levels instead of age groups, because educational attainment changes rapidly at young age levels. The question is which age levels are preferred in order to have the best indicator for comparing descendants and persons with Danish origin.

Figure 8

Percentage with a completed Danish education at vocational level or above, broken down by age and ancestry, 1 January 2013



24. Vocational level or above comprises vocational, short cycle higher education, medium cycle higher education, bachelor and long cycle higher education. From the figure it can be seen that the percentage of persons with a completed education at these levels changes fast in the 20s. It is not until the late 20s that some stability is achieved.

25. In a Danish context it would clearly be misleading as an integration indicator to look solely at the percentage with a completed education at vocational level or above among 24 year olds. Among women one would find the percentage is 43 among both women with Danish origin and non-Western descendants. This could lead to the conclusion that integration is perfect and that non-Western descendants have the same educational attainment as women with Danish origin.

26. Looking at what happens in the figure after the age of 24, one can see that this would clearly be a wrong conclusion. The percentage continues to rise for women with Danish origin, while it stagnates for non-Western descendants. Among 30 year olds, 79 per cent of the women with Danish origin have completed an education at vocational level or above, while the percentage is only 60 among non-Western descendants – a difference of 19 percentage points.

27. The reason for different results depending on age level is that non-Western descendants, to a higher degree, complete education at the vocational level which they finish early. While women with Danish origin, to a higher degree, complete higher education cycles, which in many cases they do not finish until they are in their late 20s

28. Preferences regarding education are different among persons with Danish origin and non-Western descendants. Therefore, if the idea is to have an indicator with the intention of measuring educational attainment among young people, one should pick a single age level where education is more or less complete. In the Danish context, 30 years seem like a good choice.